TABLE II

FLUX WEIGHTING FACTORS FOR DIFFERENT ARRAY SHAPES, p (3)

Array Shape	$p = \frac{\phi}{\phi_c}$
1. Sphere	$\frac{\sin (\pi r/R')}{\pi r/R'}$
2. Slab (Flux distribution measures perpendicular to face)	$\cos\left(\frac{\pi z}{2H'}\right)$
3. Slab (Flux distribution measures parallel to face)	$\cos\left(\frac{\pi x}{2W'}\right)\cos\left(\frac{\pi y}{2L'}\right)$
4. Parallelepiped or Cube (For cube W' = L' = H')	$\cos\left(\frac{\pi x}{2W'}\right)\cos\left(\frac{\pi y}{2L'}\right)\cos\frac{\pi z}{2H'}$
5. Infinite Cylinder	$J_o\left(\frac{j_o r}{R'}\right)$
6. Finite Cylinder	$J_o\left(\frac{j_o r}{R'}\right)\cos\left(\frac{\pi z}{2H'}\right)$

j_o = 2.405.

ϕ_c = Flux at the center of the array.

ϕ = Flux at any given point in the array.

For a homogeneous reactor, the primed letters have the conventional meanings of being the actual respective physical dimensions of the reactor plus an extrapolation distance determined by the reactor conditions; for symmetric geometries, all measurements are made from the geometric center of the reactor, which is also the point of greatest flux. For the analogous multi-unit arrays as described, these primed letters also represent the physical dimensions of the array, where these physical dimensions are considered as being bounded by the centers of the outer-most units, plus an "extrapolation length" which, for single-tier square arrays, is equal to one center-to-center spacing of the units in the array; all measurements are also made from the geometric center of the array.

When material bucklings, migration areas and k_∞ are available for the material in a regular array of identical units, the following equations may be used to calculate k_a:

$$k_u = \frac{1 + M^2 B_m^2}{1 + M^2 B_g^2} \qquad \text{(e)}$$

$$\text{1-U, the leakage probability} = \frac{M^2 B_g^2}{1 + M^2 B_g^2} \qquad \text{(f)}$$

Substituting (e) and (f) into equation (d):

$$k_a = \frac{\dfrac{1 + M^2 B_m^2}{1 + M^2 B_g^2}}{1 - \dfrac{M^2 B_g^2}{1 + M^2 B_g^2} \sum(q_i \Omega_{fi})} \qquad \text{(g)}$$

$$k_a = \frac{1 + M^2 B_m^2}{1 + M^2 B_g^2 \left[1 - \sum(q_i \Omega_{fi})\right]} \quad \text{or} \qquad \text{(g)}$$

$$= \frac{k_\infty}{1 + M^2 B_g^2 \left[1 - \sum(q_i \Omega_{fi})\right]}$$

If k_u is known:

$$k_a = \frac{k_u}{1 - \left[\dfrac{M^2 B_g^2 \sum(q_i \Omega_{fi})}{1 + M^2 B_g^2}\right]} \qquad \text{(h)}$$